REMARKS

The Office Action dated May 22, 2008, has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1-35 are currently pending in the application, of which claims 1, 3, 5, and 7 are independent claims. Claims 1 and 7 have been amended to more particularly point out and distinctly claim the invention. No new matter has been added.

The Office Action indicated that claims 5, 6, 16, 18, 20, 23, 26, 29, and 33 are allowed. Applicants thank the Examiner for this indication of allowance. Applicants respectfully request reconsideration and allowance of claims 1-4, 7-15, 17, 19, 21, 22, 24, 25, 27, 28, 30-32, 34, and 35.

Claims 1-4, 11, 15, 17, 22, 28, and 32 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,426,837 of Clark (Clark). Applicants respectfully traverse this rejection.

Claim 1, upon which claims 2, 9-15, and 17 depend, is directed to a polarizing element. The polarizing element has a two-layer structure in which a grating pattern having a constant period Λ is formed in a substrate. A cross section of the grating pattern has a rectangular shape. A film having a refractive index higher than that of the substrate is deposited on the grating pattern, $\Lambda\cos\theta_0 < \lambda$ where λ is a wavelength and θ_0 is an angle of incidence to a grating surface. The grating period, a grating height, and a film thickness are determined such that reflection efficiency of zero-order diffracted light of TE polarization is not lower than a predetermined value that is sufficient for the

polarizing element to function as a reflecting element while transmission efficiency of zero-order diffracted light of TM polarization is not lower than the predetermined value that is sufficient for the polarizing element to function as a transmitting element.

Claim 3, upon which claims 4, 19, 22, 25, 28, and 32 depend, is directed to a polarizing element, wherein the polarizing element has a two-layer structure in which a grating pattern having a constant period L is formed in a substrate, a cross section of the grating pattern having a triangular shape, and a film having a refractive index higher than that of the substrate is deposited on the grating pattern, Lcosq0 < l where l is a wavelength and q0 is an angle of incidence to a grating surface, and the grating period, a grating height, and a film thickness are determined such that reflection efficiency of zero-order diffracted light of one of TE polarization and TM polarization is not lower than a predetermined value that is sufficient for the polarizing element functions as a reflecting element while transmission efficiency of zero-order diffracted light of the other of TE polarization and TM polarization is not lower than the predetermined value that is sufficient for the polarizing element functions as a transmitting element.

Applicants respectfully submit that Clark fails to disclose or suggest all of the elements of any of the presently pending claims.

Clark generally describes a diffractive having a grating period that exhibits significant polarization selectivity is used as polarizing beamsplitter for obliquely incident polarized light. The grating is preferably designed to substantially transmit transverse magnetic mode (TM) polarized light and to substantially reflect transverse electric mode (TE) polarized light at certain wavelengths or angles of incidence. Due to

ease of manufacture, the polarizing beamsplitter may be integrated along with other optical elements, such as a subwavelength retarder, to form a polarization beam router, a dichroic beam combiner, a beam splitter on a curved surface, or an optical pickup using an optical beam splitter and router.

Clark fails to disclose or suggest all of the features of independent claims 1 and 3. For example, the embodiments described in Clark fail to disclose or suggest, at least, "a two-layer structure" as recited in claims 1 and 3. The Office Action relied on column 3, lines 5-10, of Clark to disclose this feature. The cited portion, however, does not show a two-layer structure. Instead, the cited portion refers to Fig. 3 and Fig. 4 of Clark, which merely illustrate a graph of transmission. Thus, Clark does not disclose or suggest at least, "a two-layer structure," as recited in the independent claims.

Indeed, Clark does not disclose or suggest that a polarizing element has a two-layer structure of a substrate that has a grating pattern and a film that has a refractive index higher than that of the substrate and is disposed on the grating pattern, as well as that a grating period, grating height, and a film thickness are determined such that the polarizing element functions as a reflecting element or as a transmitting element.

Thus, Clark also does not disclose or suggest, at least, "a film having a refractive index higher than that of the substrate is deposited on the grating pattern," as recited in claims 1 and 3. The Office Action does not even address this feature. Clark is silent regarding the feature of a film having a refractive index higher than that of the substrate or that such a film is deposited on the grating pattern.

Likewise, Clark also fails to disclose or suggest, at least, that a "grating period, a grating height, and a film thickness are determined such that reflection efficiency of zero-order diffracted light of TE polarization is not lower than a predetermined value that is sufficient for the polarizing element to function as a reflecting element while transmission efficiency of zero-order diffracted light of TM polarization is not lower than the predetermined value that is sufficient for the polarizing element to function as a transmitting element," as recited in claims 1 and 3. The Office Action took the position that the abstract and Fig. 5 of Clark disclose the above-identified feature.

Even though Clark may mention TM and TE, Clark is silent regarding the comparison between reflection efficiency of zero-order diffracted light of TE polarization and a predetermined value that is sufficient for the polarizing element functions. Also, Clark is silent regarding the feature of the grating period, a grating height, and a film thickness being determined such that the claimed transmission and reflection functionalities are achieved.

In view of the above, Clark does not disclose or suggest all of the features of claims 1 and 3. Thus, it is respectfully requested that the rejection of claims 1 and 3 be withdrawn.

Claims 2, 4, 11, 15, 17, 22, 28, and 32 depend respectively from, and further limit, claims 1 and 3. Thus, claims 2, 4, 11, 15, 17, 22, 28, and 32 recite subject matter that is neither disclosed nor suggested in the cited art. It is, therefore, respectfully requested that the rejection of claims 2, 4, 11, 15, 17, 22, 28, and 32 be withdrawn.

Claims 7-8, 24, 30-31, and 34-35 were rejected under 35 U.S.C. 103(a) as being unpatentable over Clark in view of U.S. Patent Publication No. 2001/0050892 of Takahashi ("Takahashi"). The Office Action cited Takahashi to remedy certain identified deficiencies in Clark. Applicants respectfully traverse this rejection.

Claim 7, upon which claims 8, 21, 24, 27, 30-31, and 34-35 depend, is directed to a polarizing element. The polarizing element has a two-layer structure in which a grating pattern having a constant period Λ is formed in a substrate, a cross section of the grating pattern having a triangular shape. A film having a refractive index higher than that of the substrate is deposited on the grating pattern, in the case where a first wavelength λ_1 and a second wavelength λ_2 satisfy a relationship of $\lambda_1 < \lambda_2$, $\Lambda\cos\theta_0 < \lambda_1$ where θ_0 is an angle of incidence to a grating surface. The grating period, a grating height, and a film thickness are determined such that reflection efficiency of zero-order diffracted light of TE polarization is not lower than a predetermined value that is sufficient for the polarizing element to function as a reflecting element for the first wavelength λ_1 while transmission efficiency of zero-order diffracted light of TM polarization is not lower than the predetermined value that is sufficient for the polarizing element to function as a transmitting element for the first wavelength λ_1, and such that reflection efficiency of the zero-order diffracted light of TE polarization is not lower than the predetermined value that is sufficient for the polarizing element to function as a reflecting element for the second wavelength λ_2 while transmission efficiency of the zero-order diffracted light of

TM polarization is not lower than the predetermined value that is sufficient for the polarizing element to function as a transmitting element for the second wavelength λ_2.

Applicants respectfully submit that the combination of Clark and Takahashi fails to disclose or suggest all of the elements of any of the presently pending claims.

Clark is discussed above. Takahashi generally describes a polarization beam splitter for separating an upstream beam from a downstream beam according to the polarization of an incident beam that is provided between first and second light sources emitting laser beams at respective wavelength and an objective lens.

The Office Action acknowledged that Clark does not disclose a second wavelength. The Office then relied on paragraph [0015] of Takahashi to cure the deficiencies in Clark. It appears that Clark and Takahashi fail to disclose or suggest all of the features of claim 7. For example, Clark and Takahashi fail to disclose or suggest, at least, "the grating period, a grating height, and a film thickness are determined such that reflection efficiency of zero-order diffracted light of TE polarization is not lower than a predetermined value that is sufficient for the polarizing element functions…TM polarization is not lower than the predetermined value that is sufficient for the polarizing element functions as a transmitting element for the second wavelength λ_2," as recited in claim 7. Clark and Takahashi do not describe such comparison between reflection efficiency of zero-order diffracted light of TE polarization and a predetermined value that is sufficient for the polarizing element functions. Also, Clark is silent regarding the feature of the grating period, a grating height, and a film thickness being determined in accordance with the specified reflective and transmittive chararacteristics claimed.

Furthermore, neither Clark nor Takahashi discloses the feature of "a two-layer structure" and "a film having a refractive index higher than that of the substrate is deposited on the grating pattern," as recited in claim 7. The Office Action does not even address the feature of a film having a refractive index higher than that of the substrate is deposited on the grating pattern.

Therefore, the combination of Clark and Takahashi fails to disclose or suggest all of the features of claim 7. Thus, it is respectfully requested that the rejection of claim 7 be withdrawn.

Claims 8, 24, 30-31, and 34-35 depend from and further limit claim 7. Thus, each of claims 8, 24, 30-31, and 34-35 recites subject matter that is neither disclosed nor suggested in the combination of Clark and Takahashi. It is, therefore, respectfully requested that the rejection of all of claims 8, 24, 30-31, and 34-35 be withdrawn.

Claims 9-10, 12-14, 19, and 25 were rejected under 35 U.S.C. 103(a) as being unpatentable over Clark in view of U.S. Patent Publication No. 2003/0228413 of Ohta (Ohta). The Office Action cited Ohta to remedy certain identified deficiencies in Clark. Applicants respectfully traverse this rejection.

Claims 9-10, 12-14, 19, and 25 depend respectively from, and further limit, claims 1 and 3. At least some of the deficiencies of Clark with respect to claims 1 and 3 are discussed above. Ohta does not remedy the above-identified deficiencies of Clark.

Ohta generally describes a surface treating method for forming a coating layer on a base material that includes a plasma processing under an atmospheric pressure for the

base material so as to form a coating layer on the base material having at least one of a curved surface and an uneven surface.

Ohta does not cure the deficiencies in Clark as failing to disclose or suggest, at least, "a two-layer structure" and "a film having a refractive index higher than that of the substrate is deposited on the grating pattern," as recited in claims 1 and 3, or any of the other above-identified deficiencies of Clark. As discussed above, Clark also fails to disclose these limitations. Therefore, the combination of Clark and Ohta fails to disclose or suggest all of the features of claims 1 and 3.

Claims 9, 10, 12-14, 19, and 25 depend respectively from, and further limit, claims 1 and 3. Thus, each of claims 9, 10, 12-14, 19, and 25 recites subject matter that is neither disclosed nor suggested in the combination of Clark and Ohta. It is, therefore, respectfully requested that the rejection of all of claims 9, 10, 12-14, 19, and 25 be withdrawn.

Claims 21 and 27 were rejected under 35 U.S.C. 103(a) as being unpatentable over Clark in view of Takahashi and further in view of Ohta. The Office Action cited Ohta certain identified deficiencies of the combination of Clark and Takahashi. Applicants respectfully traverse this rejection.

Claims 21 and 27 depend from and further limit claim 7. As can be seen from the discussion above, the combination of cited references does not disclose or suggest at least the features discussed above with respect to the rejection of claim 7. There is no further teaching that results from the combination of the references that is not found in the references individually. However the references may be considered, therefore, the

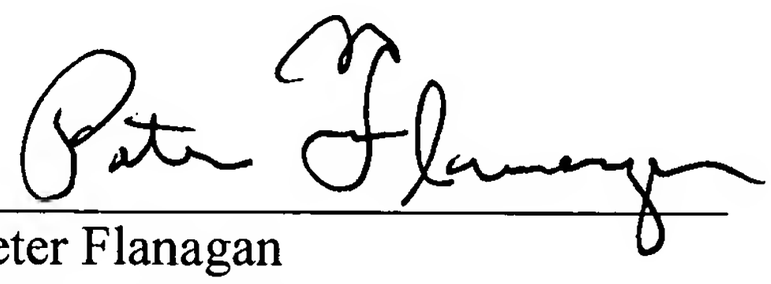
combination of Clark, Takahashi, and Ohta cannot disclose or suggest all of the elements of claim 7, or of claims 21 and 27, which depend from them. Thus, withdrawal of the rejections of claims 21 and 27 are respectfully requested.

For the reasons set forth above, it is respectfully submitted that each of claims 1-35 recites subject matter that is neither disclosed nor suggested in the cited art. It is, therefore, respectfully requested that all of claims 1-35 be allowed, and that this application be passed to issuance.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, Applicants' undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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Enclosures: Information Disclosure Statement
PTO-1449 Form
References (3)
European Search Report